Secondary Dentin for Age Determination

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Abstract

Objective:
To evaluate the secondary dentin formation with age.
Methods:
We evaluated 36 bitewing radiographs of the first maxillary and mandibular molar, aged 15 to 25 years. The images were grouped into three groups. Pulp area of clinical crown, total pulp area and pulp width at cervix measurements were made from image of each first molar.

Results:
Pulp area of clinical crown, total pulp area and pulp width at cervix significantly decrease with advanced age.
Conclusion:
Secondary dentin acts as indicator of age because area decrease is due to secondary dentin formation.

INTRODUCTION

Odontometry has been performed on various tooth groups with the objective of establishing measurements that can act as standards, and this may facilitate some procedures for dental surgeon. Dental practitioners rely on bitewing radiographs as a routine diagnostic tool. In coronal dentin, the average diameter of tubules at dentino-enamel junction is 0.5 to9 0.9 um. After the primary dentin formation, dentin deposition continues at reduced rate even without obvious external stimulus, though the rate and amount of this physiologic secondary dentin varies considerably among individuals and sex. Secondary dentin forms on all internal aspects of pulp cavity, but in the pulp chamber in multi rooted teeth it tends to be thicker on the roof and floor than on the side walls.[1]

Sex difference has been reported in the value of the dentin pulp complex and enamel.[2,3] The aim of this study was to investigate the dimensions of first molar pulp chambers as seen as a collection of bitewing radiographs from individuals of 15 to 25 years of age.

MATERIALS AND METHODS

Thirty-six patients (aged 15 to 25 years) bitewing radiographs of first molars without restorations or fracture were taken. Only radiographs with good superimoposition of cusp tips and no overlapping of mesial and distal borders of adjacent teeth were measured. Pulp width at cervix, area of clinical crown and total pulp area (Fig. 1) was recorded. The examiner performed all measurements using a digital caliper on a light table. Statistical significance of the results was determined using student t-test (SPSS version 7.0).

RESULTS

Table 1 shows the mean values and standard deviation of total pulp area (in mm^2), clinical crown pulp area (in mm^2) and cervix pulp width (in mm) for first maxillary and mandibular molar.

Figure 1

Age groups (in years) and number	Maxillary first molar (mean ± SD)			Mandibular first molar (mean ± SD)		
	Total pulp area	Clinical crown pulp area	Cervical pulp width	Total pulp area	Clinical crown pulp area	Cervical pulp width
21.1-25 (n=11)	7.31±2.13	3.26±1.42	2.81±0.63	8.53±2.24	3.56±1.62	4.17±0.72
18.1-21 (n=12)	7.94±2.15	3.85±1.39	2.93±0.62	8.96±2.27	3.92±1.63	4.82±0.73
15-21 (n=13)	8.34±2.17	4.16±1.43	3.18±0.67	9.27±2.26	4.13±1.64	5.16±0.69

p<0.01 at all.

Clinical crown pulp area, total pulp area and cervix pulp width decreased significantly with advanced age (table 1, $p<0.01$).

DISCUSSION AND CONCLUSION

Age assessment using teeth provided the most reliable guide in the process of identification. Various methods are utilized which includes visual method, radiographic method, histological method, computer assisted method and comparison with ante-mortem data. Bitewing radiographs were studied for pulp chamber morphology is seen better on those films than on periapical radiographs.[4] Pulp areas in mandibular was decrease in 27% ages from 20 to 60 years[5].

In this study decrease in total pulp area, crown pulp area and cervix pulp width with advancing age.

The decrease in pulp area is due to secondary dentin formation with advancing age. It has been reported that width of the pulp chamber in 473 maxillary and 429 mandibular first molars on radiographs and its reduction in size with aging as in our study. The present study of areas on radiographs has the advantage of being non destructive and total pulp area, crown pulp area, cervix pulp width decrease with age. It is due to secondary dentin formation with advanced age. So secondary dentin formation acts as an indicator for age determination.

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